Remarks

Claims 1-20 are now pending in this application. Claims 1-11 are rejected. Claims 12-20 have been newly added. No new matter has been added. Applicants respectfully submit that the pending claims defined allowable subject matter.

As an initial matter, please note the new attorney docket number of 148341NM.

The provisional rejection of claims 1-11 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 in co-pending U.S. Patent Application Nos. 10/283,213, 10/283,292 and 09/935,705 is respectfully traversed. Claims 1-25 in these applications have not issued in U.S. Patents. For at least the reasons set forth above, Applicants respectfully request that the provisional double patenting rejection of claims 1-11 be withdrawn.

Claims 1-11 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Su et al. (U.S. Patent 6,493,572). Applicants respectfully traverse this rejection.

Su et al. describes an inherently de-coupled sandwiched solenoidal array coil (SSAC) for use in receiving nuclear magnetic resonance (NMR) radio frequency (RF) signals in both horizontal and vertical-field magnetic resonance imaging (MRI) systems (abstract). The SSAC includes a receive coil 1 consisting of two loop or solenoidal sections 1a and 1b that are spatially separated by distance W. The two loop or solenoidal sections may consist of either single or multiple conductive windings (turns) and are electrically connected by a pair of parallel conductors 1c and 1d, such that an electrical current (i) in coil 1 flows clockwise in section 1b but counterclockwise in section 1a or vice versa (column 6, lines 38-49).

The structure of coil 1 is sometimes referred to as a "gradient-field" coil arrangement because the composite magnetic field generated by the two separated sections changes in magnitude (substantially linearly) as a gradient between the two sections. Further SSAC includes receive coil 2, which also may be a single-turn loop or a multiple-turn solenoid, and is "sandwiched" between sections 1a and 1b of the gradient-field arrangement of coil 1 to form an RF coil array. The separated sections of coil 1 are electrically connected and positioned so that a current in coil 1 flows in opposite circumferential directions through the

conductive windings in sections 1a and 1b such that magnetic fields generated from sections located at opposite sides (axial ends) of the coil achieve a null at the location of coil 2. This structural configuration provides an inherent "decoupling" of the two coils when used together as an array for receiving NMR signals (column 6, lines 50-67).

Moreover, sections 1a and 1b and geometrically symmetrical with respect to coil 2, thereby making the flux linkage to each section equal in magnitude but opposite in sign. Consequently, the magnetic flux linkage to coil 1 is zero (column 8, lines 11-15).

Claim 1, as amended, recites a MRI coil array having "a first coil having a null B_1 point and a quasi-one-peak sensitivity profile with only one peak." Su, et al. fails to describe or suggest such a coil array. Su et al. merely describes an inherently de-coupled sandwiched solenoid array coil having an "M" shaped sensitivity with two peaks and a null in between. Claim 1 recites a sensitivity profile with only one peak. Su et al. fails to describe or suggest such a sensitivity profile. Therefore, for at least the reasons set forth above, Applicants submit that claim 1 is patentable over Su et al.

Claim 6, as amended, recites a MRI coil array having a "first coil having a quasi-one-peak sensitivity profile with only one peak." As discussed above, Applicants submit that Su et al. fails to describe or suggest such a sensitivity profile and Applicants submit that claim 6 is patentable over Su et al.

Claim 10 recites a MRI coil array having "a first solenoidal coil having a first section and a second section" and "a second solenoidal coil, said second coil being oriented with respect to said first coil to reduce coupling wherein said second coil is oriented about said second section." Su et al. fails to describe or suggest such a coil array.

Su et al. merely describes a sandwiched solenoidal array coil and fails to describe or suggest any coil arrangement other than one in which a second coil is disposed between two separated solenoidal sections of the first coil in a region where the combined opposing magnetic fields cancel to become a null. Su et al., in the Background of the Invention, states that various methods and schemes for overlapping the elemental coils in a coplanar loop type array coil have contributed toward making coplanar array coils practical and popular for use in horizontal-field MRI systems (column 3, lines 52-57). However, Su et al. fails to describe or suggest a coil array wherein said second coil is oriented about said second section of a first

solenoidal coil as recited in claim 10. Therefore, for at least reasons set forth above, Applicants submit that claim 10 is patentable over Su et al.

Claim 11 recites a MRI coil array having "a first solenoidal coil having a first section and a second section" and "a second solenoidal coil, said second coil being oriented with respect to said first coil to reduce coupling, wherein said second coil is cascaded with said first coil." Su et al. fails to describe or suggest such a coil array. As discussed above, Su et al. merely describes a sandwiched solenoidal array coil and fails to describe or suggest an array wherein a second coil is cascaded with a first coil as recited in claim 11. There is simply no description in Su et al. of a cascaded coil arrangement. Therefore, for at least reasons set forth above, Applicants submit that claim 11 is patentable over Su et al.

Claims 2-5, 7-9 and newly added claims 12-17 each depend from an allowable independent claim patentable over the cited art as discussed above. For at least reasons set forth above, Applicants submit that when the recitations of these claims are considered in combination with the recitations of the independent claims, these claims are likewise patentable over the cited references.

Newly added claim 18 recites a method for providing a MRI coil including "configuring a first coil having a null B_1 point in a quasi-one-peak sensitivity profile with only one peak." The references cited failed to describe or suggest a method for providing a MRI coil array as recited in independent claim 18. Accordingly, Applicants submit that claim 18 is patentable over the cited art.

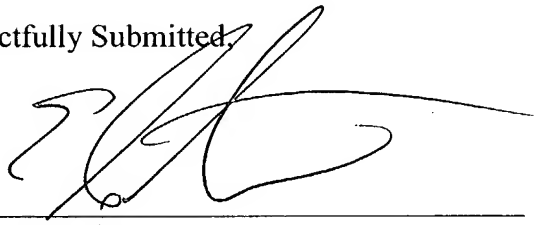
Newly added claims 19 and 20 depend from newly added independent claim 18, which is submitted to being condition for allowance and patentable over the cited art. For at least the reasons set forth above, Applicants submit that when the recitations of claims 19 and 20 are considered in combination with the recitations of claim 18, these claims are likewise patentable over the cited references.

For at least the reasons set forth above, Applicants respectfully request that the rejection of claims 1-11 be withdrawn and claims 1-20 allowed.

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art fails to teach or suggest the claimed invention and all of the pending claims in this application are believed to be in condition for allowance. Reconsideration and favorable

action is respectfully solicited. Should anything remain in order to place the present application in condition for allowance, the Examiner is kindly invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,



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